

## **REMARKS**

Claims 1, 2, 22, 24, 39, 44, 53, 56, 59, 63, 66 and 68 have been amended. Claims 64, 67 and 69 have been canceled. Thus, claims 1-6, 9-29, 32-41, 44-63, 65, 66, 68, 70 and 71 remain pending in the application. Reconsideration is respectfully requested in light of the following remarks.

### **Section 102(b) Rejection:**

The Office Action rejected claims 1-6, 9, 16-22, 24-29, 36-42, 44-46 and 50-52 under 35 U.S.C. § 102(b) as being anticipated by Flaig, et al. (U.S. Patent 5,105,424) (hereinafter “Flaig”). Applicant respectfully traverses this rejection in light of the following remarks.

Regarding claim 1, Flaig does not teach, for each of a plurality of messages, dynamically selecting a route in the interconnection fabric from among a plurality of independent routes for sending the message from a sending node to a destination node, wherein dynamically selecting a route comprises identifying a routing directive for the selected one of the plurality of independent routes from the sending node to the destination node, wherein said dynamically selecting a route comprises selecting different ones of the independent routes from the sending node to the destination node for at least two of the messages. As described in Applicant’s specification at p. 11, lines 21-26, the route for a message is selected dynamically, e.g. when sending the message. In contrast, Flaig teaches a deadlock-free routing method of sending packets on a *fixed route* on a mesh of first X and then Y (Flaig column 6, lines 24-28 and column 7, lines 19-40). Flaig even refers to this as a “design criteria must” (column 6, line 25). In other words, Flaig teaches the use of only a single, fixed route between any two nodes. This is very different from dynamically selecting the route from among a plurality of independent routes for sending the message from a sending node to a destination node.

Moreover, Flaig does not teach selecting different ones of the independent routes from the sending node to the destination node for at least two of the messages. In contrast, for any given pair of source and destination nodes, Flaig uses a single fixed route.

Similar arguments apply in regard to independent claims 22 and 39.

With regard to claims 4 and 28, the Examiner points to Flaig column 11, lines 12-13 as teaching wherein the routing directive further comprises a pointer to the current segment, and wherein said removing the current segment comprises moving the pointer to the next segment, but this passage only discusses a pointer for moving data between a router and DRAM within a node. Flaig does not anticipate claims 4 and 28 and thus, the rejection of these claims is not supported by the prior art and removal thereof is respectfully requested.

With regard to claims 6 and 29, the Examiner points to Flaig column 7, lines 22-25 as teaching wherein the subsequent node selecting a port corresponding to the direction component comprises selecting the corresponding output port if the direction component for the current segment specifies a routing direction; and selecting a device port if the direction component for the current segment specifies that the subsequent node is the destination for the message. However, this portion of Flaig mentions nothing of selecting between an output port or a device port dependent upon the direction component of the current segment. Flaig does not anticipate claims 6 and 29 and thus, the rejection of these claims is not supported by the prior art and removal thereof is respectfully requested.

With regard to claims 21, 38 and 42, the Examiner points to Flaig column 5, lines 6-8 as teaching wherein the destination node is configured to communicate with a storage device and wherein the storage device comprises a disk drive. At the cited passage, Flaig teaches only storing the message packet in RAM. Flaig does not anticipate claims 21, 38,

and 42 and thus, the rejection of these claims is not supported by the prior art and removal thereof is respectfully requested.

Applicant also asserts that numerous other ones of the dependent claims recite further distinctions over the cited art. However, since the independent claims have been shown to be patentably distinct, a further discussion of the dependent claims is not necessary at this time.

### **Section 103(a) Rejection:**

The Office Action rejected claims 10-15, 33-35, 47-49, 53, 59, 61-64 and 66-70 under 35 U.S.C. § 103(a) as being unpatentable over Flaig in view of Walker et al. (U.S. Patent 5,613,069) (hereinafter “Walker”), and claim 71 as being unpatentable over Flaig in view of Brantley, Jr., et al. (U.S. Patent 4,980,822) (hereinafter “Brantley”).

In regard to claim 53, Flaig in view of Walker does not teach or suggest encoding a return routing directive in the message, wherein the return routing directive describes the return route and comprises at least one segment, wherein each segment comprises a direction component and a distance component; and sending the message on one of the output ports of the sending node, wherein the message includes both the routing directive and the return routing directive when sent from the initial sending node. The Examiner admits that Flaig does not teach encoding a return routing directive in the message. The Examiner refers to Walker in regard to this feature of claim 53. However, Walker specifically states that the message is initially sent without a return directive (“routing trailer is null”). In Walker, the return directive is dynamically generated only after the message has been sent from the initial sending node. *See*, Walker – col. 8, lines 15-24. Therefore, Walker specifically does not teach or suggest that the message includes both the routing directive and the return routing directive when sent from the initial sending node, as is recited in claim 53.

Moreover, the return directive in Walker is based on independent routelets that define an absolute switching path that depends only on the hardware configuration of the node. *See*, Walker – col. 7, lines 24-20. The routelet-based mechanism of Walker specifically does not use direction and distance components. Therefore, it would not make sense to apply the routelet-based return route encoding of Walker to the routing mechanism of Flaig. The cited art does not teach a return routing directive that uses distance and direction components.

Similar arguments as discussed above for claim 53 also apply in regard to independent claims 56 and 59.

In regard to claim 63, Flaig in view of Walker does not teach or suggest that incrementally encoding a return routing directive in the message comprises incrementing the distance component for a current segment of the return routing directive; wherein if, after said decrementing, the distance component for the current segment of the routing directive is zero, the method further comprises modifying the direction component of a current segment of the return routing directive and adding a new segment to the return routing directive so that the new segment becomes the current segment of the return routing directive when the message is sent on the selected output port. As discussed above, the return directive in Walker is based on independent routelets that define an absolute switching path that depends only on the hardware configuration of the node. *See*, Walker – col. 7, lines 24-20. The routelet-based mechanism of Walker specifically does not use direction and distance components. Therefore, it would not make sense to apply the routelet-based return route encoding of Walker to the routing mechanism of Flaig. The cited art does not teach a return routing directive that uses distance and direction components.

The Examiner refers to col. 3, lines 17-20 of Flaig. However, this portion of Flaig mentions nothing of incrementally encoding a return routing directive in the message comprises incrementing the distance component for a current segment of the return

routing directive; wherein if, after said decrementing, the distance component for the current segment of the routing directive is zero, the method further comprises modifying the direction component of a current segment of the return routing directive and adding a new segment to the return routing directive so that the new segment becomes the current segment of the return routing directive when the message is sent on the selected output port.

Similar arguments as discussed above for claim 63 also apply in regard to independent claim 66.

In regard to claim 68, Flaig in view of Walker does not teach or suggest that the controller is further configured to incrementally encode a return routing directive describing a return route from the destination node to the source node in the message, wherein the return routing directive describes a return route from the destination node to the sending node and comprises at least one segment, and wherein each segment comprises a direction component and a distance component, and wherein the return routing directive is configured to be incrementally added to as the message is routed to the destination node, wherein the return routing directive is further configured to be used to return an error message to the source node if a routing error is encountered. As discussed above, the return directive in Walker is based on independent routelets that define an absolute switching path that depends only on the hardware configuration of the node. *See*, Walker – col. 7, lines 24-20. The routelet-based mechanism of Walker specifically does not use direction and distance components. Therefore, it would not make sense to apply the routelet-based return route encoding of Walker to the routing mechanism of Flaig. The cited art does not teach a return routing directive that uses distance and direction components.

Furthermore, Flaig in view of Walker does not teach or suggest the return routing directive is further configured to be used to return an error message to the source node if a routing error is encountered. The Examiner refers to col. 9, lines 57-62 of Flaig. This

portion of Flaig refers to an “acknowledgement wire” which has nothing to do with a return routing directive that is configured to be used to return an error message to the source node if a routing error is encountered.

In regard to claim 71, Flaig in view of Walker does not teach or suggest a storage system comprising a plurality of nodes wherein different ones of said plurality of nodes perform different functions in the storage system, wherein each one of a first portion of said plurality of nodes are storage nodes each comprising at least one mass storage device, and wherein each one of a second portion of said plurality of nodes is a host interface node configured to provide an interface for the storage system to a host computer. The Examiner admits that these limitations are not taught by Flaig. The Examiner relies on Brantley. However, Brantley describes a multiprocessing system in which all of the nodes are identical, as shown in FIGs. 1 & 2. *See also*, Brantley – col. 4, lines 30-59. Thus, Brantley clearly does not suggest a storage system comprising a plurality of nodes wherein different ones of said plurality of nodes perform different functions in the storage system. The Examiner refers to this limitation of claim 71 as “subjective”. The Examiner’s opinion that the limitation is subjective is not a proper basis for rejection. The Examiner must provide prior art that teaches the claim limitation and a proper motivation to combine the references. Moreover, routing systems such as described in Flaig and Brantley have generally been used in systems which route communication among a plurality of identical nodes, such as the homogenous multiprocessing nodes of the systems in Flaig and Brantley. The prior art does not suggest using these types of networks in heterogeneous systems where different ones of the nodes perform different functions.

Furthermore, the cited art does not teach or suggest a storage system comprising a plurality of nodes wherein different ones of said plurality of nodes perform different functions in the storage system, wherein each one of a first portion of said plurality of nodes are storage nodes each comprising at least one mass storage device, and wherein

each one of a second portion of said plurality of nodes is a host interface node configured to provide an interface for the storage system to a host computer. The “associate memory module” in each node in Brantley is the processor memory, not a mass storage device.

In regard to all of the rejections under both § 102 and § 103, Applicant asserts that numerous other ones of the dependent claims recite further distinctions over the cited art. However, since the independent claims have been shown to be patentably distinct, a further discussion of the dependent claims is not necessary at this time.

## CONCLUSION

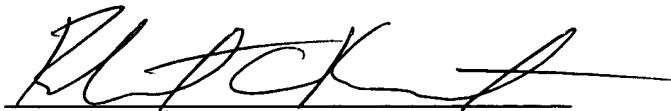
Applicants submit the application is in condition for allowance, and notice to that effect is respectfully requested.

If any extension of time (under 37 C.F.R. § 1.136) is necessary to prevent the above referenced application from becoming abandoned, Applicant hereby petitions for such extension. If any fees are due, the Commissioner is authorized to charge said fees to Meyertons, Hood, Kivlin, Kowert, & Goetzel, P.C. Deposit Account No. 501505/5181-68300/RCK.

Also enclosed herewith are the following items:

- ☒ Return Receipt Postcard
- ☐ Petition for Extension of Time
- ☐ Notice of Change of Address
- ☐ Fee Authorization Form authorizing a deposit account debit in the amount of \$  
for fees (        ).
- ☐ Other:

Respectfully submitted,



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